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BULLETIN NO. 159. JULY, 1913.

STEER FEEDING

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STEER FEEDING

BY

JOHN C. BURNS*

SILAGE COMPARED WITH COTTON SEED HULLS, AND COTTON SEED MEAL COMPARED WITH COTTON SEED FOR FATTENING CATTLE.

INTRODUCTION.

The experiments reported in this bulletin constitute the first work of an experimental nature that has been completed on the Feeding and Breeding Station since its establishment here a little over a year ago. They were conducted here during the past fall, winter and spring.

The experiment to be discussed first was in part similar to the one that the station conducted at Clarendon during the winter and spring of 1911-1912, and reported in Bulletin No. 153, the title of which was "A Test of the Relative Values of Cotton Seed Meal and Silage, and Cotton Seed Meal and Cotton Seed Hulls for Fattening Cattle." It was, however, more extensive than the Clarendon experiment, in that silage was fed in more combinations, thereby affording a better opportunity of ascertaining its true feeding value and at the same time making it possible to compare the feeding stuffs with which it was supplemented, viz: cotton seed meal and cotton seed.

The purpose of this experiment, therefore, was to make a further comparison of silage and cotton seed hulls in conjunction with cotton seed meal for fattening cattle, and to ascertain the relative values of cotton seed meal and cotton seed as supplements to silage.

Among experienced feeders, it is a generally accepted fact that at current prices, cotton seed meal is a more economical feed than cotton seed, unless it be when the seed is fed in very limited quantity. At the same time, numerous inquiries regarding the relative merits of the two feeds, make it important that information be disseminated, based on actual tests with meal and seed as supplements to silage.

The results of this experiment with those of the Clarendon experiment reported in Bulletin No. 153, should certainly be conclusive evidence of the great value of silage in rations for beef cattle.

CATTLE USED.

The cattle used in the experiment were purchased from the ranch of Mrs. H. M. King in Nueces county, where they had been raised under range conditions. They were well graded Shorthorn and Hereford steers,—19 head of the former and 9 head of the latter,—and were

*Assisted by C. N. Kennedy and C. S. Scharff.

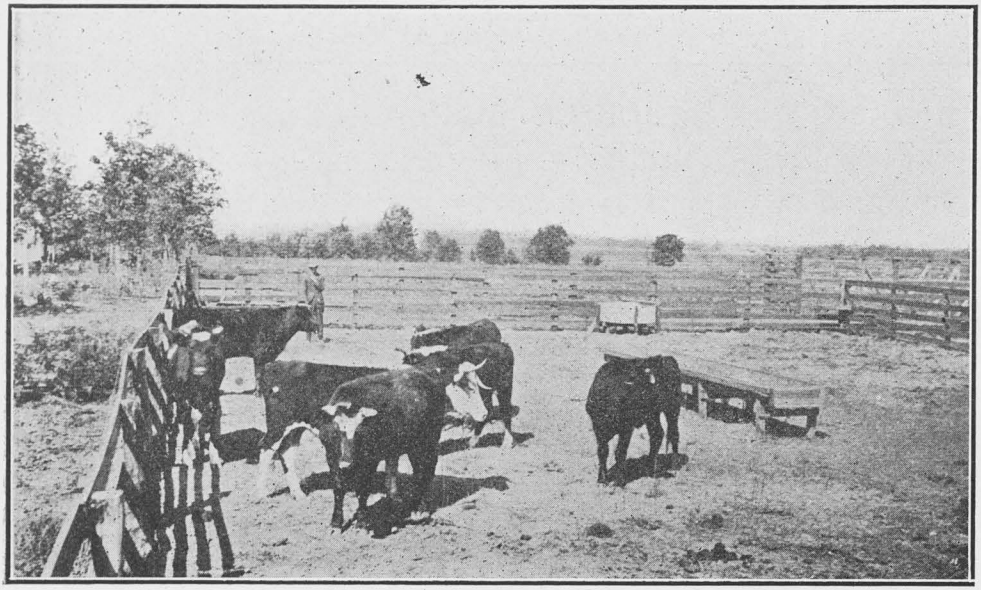

Plate I. The steers of Lot I at the beginning of the experiment.

Plate II. The steers of Lot II at the beginning of the experiment.

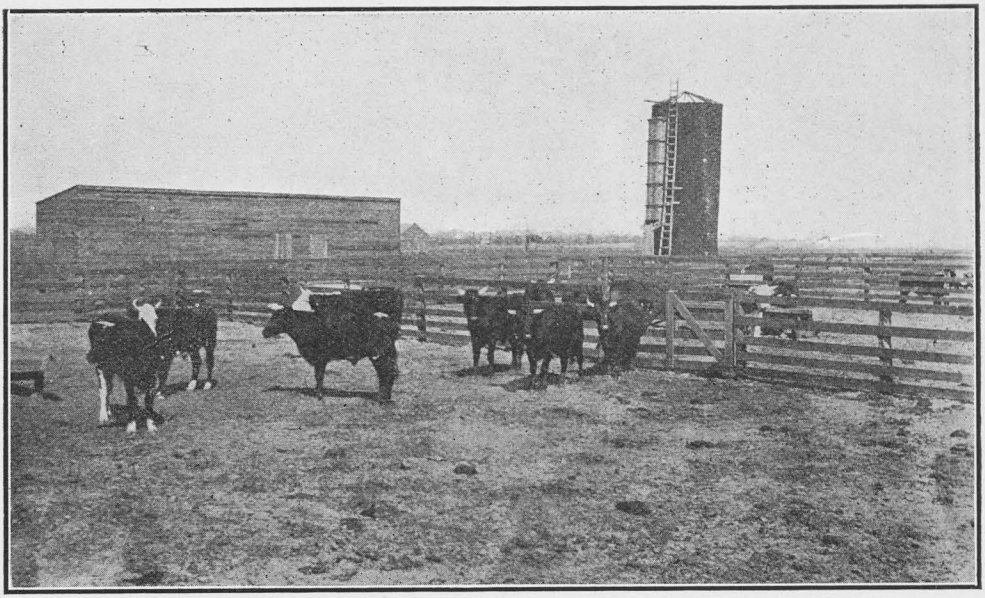

Plate III. The steers of Lot III at the beginning of the experiment.

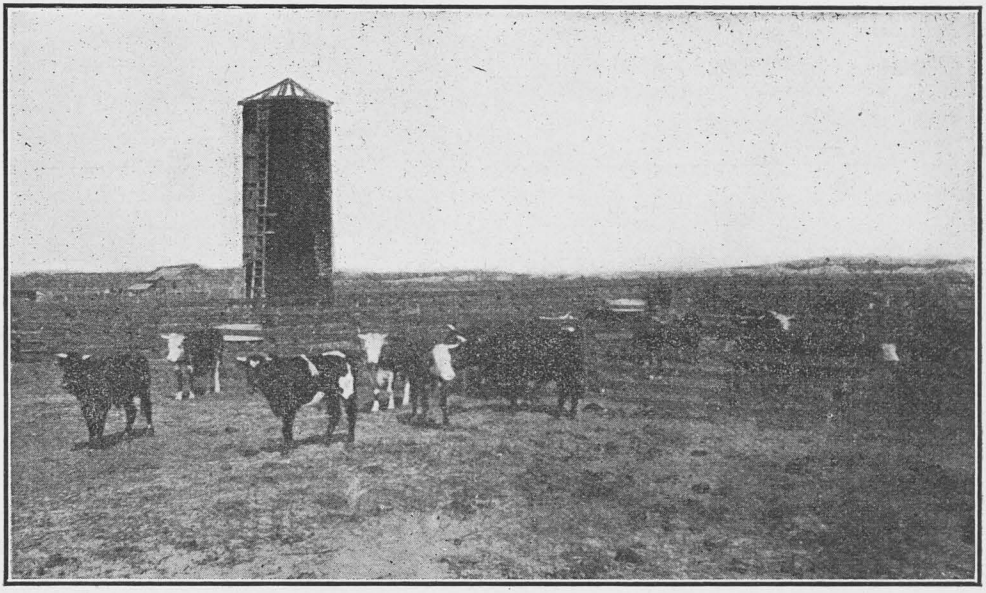

Plate IV. The steers of Lot IV at the beginning of the experiment.

two years past in age. Most of them were of average quality and of very good feeder conformation. Eight head were rather narrow, shallow bodied and leggy, and, hence, noticeably inferior to the others, a fact which made against as much uniformity in the bunch as a whole as was desirable. All were rather thin in flesh but in good thrift when the experiment began. They were loaded for shipment at Kingsville the evening of October 4, 1912, and were unloaded at College Station about 6:30 a. m., October 7, 1912, having been en route about sixty hours.

Things were not gotten in readiness for the experiment to begin until October 16, 1912, and, hence, from the time the steers arrived until this date they were fed South Texas prairie hay, and sorghum hay raised on the Station farm. During this period the 28 head consumed 1767 pounds of prairie hay valued at $8.00 per ton and 2864 pounds of sorghum hay valued at $12.00 per ton.

The steers cost us $40.00 a head, f. o. b. Kingsville; the freight on them and the feed charges en route amounted to $1.37 a head; and the value of the hay they consumed at College Station previous to the beginning of the experiment amounted to 87 cents a head. Hence, they had cost us at the beginning of the experiment $42.24 a head. Their average weight at this time was 853 pounds, thus making the cost per hundredweight $4.95.

FEEDS USED.

Chemical analyses show that the greater portion of the cotton seed meal used in the experiment was below prime grade. The other feeds, viz: cotton seed hulls, cotton seed, and silage were of very good quality. Two kinds of silage were used, that fed during the first 107 days of the test being composed of sorghum and cowpeas and that fed during the remaining 32 days being composed of Indian corn. It was estimated that the former contained about 90 per cent sorghum and 10 per cent cowpeas.

The average analysis of each feed as determined by the Chemistry Division of the Experiment Station is shown in the following table:

TABLE I.

FEEDS	Percentage Composition						Analysis Numbers
	Water	Ash	Protein	Crude Fiber	Nitrogen Free Extract	Fat	
Cotton seed meal	7.47	5.53	41.61	10.52	25.70	9.15	6875-7050-6948
Cotton seed hulls	8.34	2.39	3.47	49.04	35.85	.88	6947-7048-7049-6876
Cotton seed	7.69	3.22	22.66	25.58	25.58	15.26	6877-6945
Sorghum-Cowpea Silage	67.34	2.12	2.28	8.70	18.59	.95	6874-6942-6993-6998-6999
Corn Silage*	73.6	2.1	2.7	7.8	12.9	.9	

The calculations as to the financial results of the experiment are based on the following prices for the feeds:

*Taken from "Feeds and Feeding," by Henry.

Cotton seed meal	$27.00 per ton.
Cotton seed hulls	7.00 per ton.
Cotton seed	17.00 per ton.
Silage	2.50 per ton.

PLAN OF EXPERIMENT.

The morning of October 16, 1912, the steers were divided into four lots of 7 head each, the lots being designated as I, II, III, and IV. The division was made as equally as possible with regard to breed, conformation, quality, condition and weight.

The pens in which the steers were confined and fed throughout the test were equal in all respects. They were 60 x 100 feet in area, had neither sheds nor wind breaks, and hence, were entirely unprotected from the weather. Each was provided with a galvanized iron water trough in which water from a deep well was pumped and kept before the cattle at all times. Granular salt was kept in a small trough in the corner of each pen so that the cattle had free access to it throughout the test.

The four lots were fed as follows:

Lot I. Cotton seed meal and cotton seed hulls.
Lot II. Cotton seed meal and silage.
Lot III. Cotton seed meal, cotton seed hulls, and silage.
Lot IV. Cotton seed and silage.

The day's ration for each lot was carefully weighed and divided into two equal parts, one part being fed early in the morning and the other late in the afternoon. The feeds composing each ration were thoroughly mixed together in the feed troughs.

Weights of the cattle were taken at intervals of every 30 days throughout the test, except for the last period which covered only 19 days. All weighings were made between 10 and 11 o'clock a. m.

THE FEEDING TEST.

The experiment covered a period of 139 days, from the evening feed of October 16, 1912, to the morning feed of March 4, 1913.

The day's ration per steer for each lot at the beginning was as follows:

Lot I. Two pounds cotton seed meal, 20 pounds cotton seed hulls.
Lot II. Two pounds cotton seed meal, 24 pounds silage.
Lot III. Two pounds cotton seed meal, 10 pounds cotton seed hulls, 12 pounds silage.
Lot IV. Three pounds cotton seed, 24 pounds silage.

After only a few days taken to get the cattle accustomed to their feed, the hulls and silage were rapidly increased, as much being given as was readily consumed. It was noticeable from the beginning, and in fact, throughout the experiment that Lots II and III, the former receiving meal and silage and the latter receiving meal, hulls, and silage, ate their feed with much more relish than did Lot I receiving meal and hulls and Lot IV receiving seed and silage. Hence, the rations of Lots

II and III were evidently more palatable than those of Lots I and IV. It is a well known fact that silage, even when fed alone, is considerably more palatable than hulls fed alone. Mixed with cotton seed meal the palatability of both feeds seems to be greatly improved. Cotton seed, though a palatable feed, is evidently less so than cotton seed meal and this, together with the fact that the seed and silage could not be as thoroughly mixed together as could the meal and silage, no doubt, explain why the cattle of Lot IV did not eat their feed with quite as much relish as did those of Lots II and III.

In getting the cattle to full feed, the cotton seed meal and the cotton seed were increased at a much slower rate, of course, than was the roughage portion of the rations. Since it may be safely concluded that a larger quantity of cotton seed meal may be fed without injurious effects in connection with silage, on account of its succulent character, than with cotton seed hulls, it is very probable that had the meal been increased somewhat more rapidly in Lot II and, possibly, in Lot III, even better results would have been obtained. In other words, it would likely have been better for these lots, had the quantity of meal been increased gradually from about 3 pounds per head daily at the start to 5 pounds by the end of 40 days; kept at this until the end of 80 days and then increased to 6 pounds for the remainder of the period. It was not considered best to increase the meal for Lot I, receiving cotton seed hulls, quite so rapidly and since a direct comparison of silage and hulls was desired, the amounts of meal for Lots I, II, and III were kept the same.

A very noticeable condition existed, especially in Lot I and to a lesser degree in Lot III and this was that, throughout the experiment both of them consumed a great deal more salt and drank a great deal more water than Lots II and IV. Though, this it attributed, of course, to the drier character of the rations on which they were fed, it is nevertheless, a point of much importance from the fact that it very likely had much to do with the somewhat greater gains they made as well as the much greater shrinkage they sustained in shipment to market.

Weather conditions were quite severe during much of the experiment. It rained a great deal during December and January and the wind and cold were quite severe during much of that period. The pens became very muddy and the cattle were therefore kept from lying down much of the time.

It will be noted that at the end of 120 days' feeding, cotton seed meal was substituted for cotton seed in Lot IV, so that the feeding of cotton seed only lasted 120 days. A study of Table V showing the results for the fourth 30 day period, will partly explain why this change was made. It will be noted that the average daily gain per head for Lot IV during that period was only .47 pounds and that the cost of feed per 100 pounds of gain was $26.95. The quantity of seed had been gradually increased from the beginning until on January 15, it reached 9 pounds a head. It had been planned to continue it at this amount until the end of the experiment, but the steers began scouring and it was soon evident that they were receiving more seed than they could stand. The gains had been fairly satisfactory until the seed was increased beyond

8 pounds, though not quite as good as those produced from the meal and silage in Lot II. Whether they would have been better than they were afterward, if the seed had not been increased over 8 pounds, cannot be said, but the writer does not believe that they would have been as economical as the gains from the meal and silage. As soon as the change to meal was made the steers took to their feed with better appetites, consumed a larger amount of silage, and became normal in their droppings. A comparison of the gains made during the last period of 19 days with those of the previous periods will show how much more effective was the ration of meal and silage than was that of seed and silage.

The average of the rations fed each lot for each period of the experiment is shown as follows:

First period—30 days.

Lot I— 2.6 lbs. cotton seed meal.
22.6 lbs. cotton seed hulls.

Lot II— 2.6 lbs. cotton seed meal.
42.3 lbs. silage.

Lot III— 2.6 lbs. cotton seed meal.
11.3 lbs. cotton seed hulls.
32.3 lbs. silage.

Lot IV— 4.1 lbs. cotton seed.
37.4 lbs. silage.

Second period—30 days.

Lot I— 3.1 lbs. cotton seed meal.
29.2 lbs. cotton seed hulls.

Lot II— 3.1 lbs. cotton seed meal.
56.1 lbs. silage.

Lot III— 3.1 lbs. cotton seed meal.
15 lbs. cotton seed hulls.
41.8 lbs. silage.

Lot IV— 5 lbs. cotton seed.
49 lbs. silage.

Third period—30 days.

Lot I— 4.3 lbs. cotton seed meal.
30 lbs. cotton seed hulls.

Lot II— 4.3 lbs. cotton seed meal.
52.1 lbs. silage.

Lot III— 4.3 lbs. cotton seed meal.
15 lbs. cotton seed hulls.
39.3 lbs. silage.

Lot IV— 7.2 lbs. cotton seed.
44.5 lbs. silage.

Fourth period—30 days.

Lot I— 5.1 lbs. cotton seed meal.
30 lbs. cotton seed hulls.

Lot II— 5.1 lbs. cotton seed meal.
52 lbs. silage.

Lot III— 5.1 lbs. cotton seed meal.
15 lbs. cotton seed hulls.
42 lbs. silage.

Lot IV— 8.9 lbs. cotton seed.
42 lbs. silage.

Fifth period—19 days.

Lot I— 6 lbs. cotton seed meal.
30 lbs. cotton seed hulls.

Lot II— 6 lbs. cotton seed meal.
52 lbs. silage.

Lot III— 6 lbs. cotton seed meal.
15 lbs. cotton seed hulls.
42 lbs. silage.

Lot IV— .56 lbs. cotton seed.
5.6 lbs. cotton seed meal.
49.2 lbs. silage.

The results of the experiment are shown in detail in the following tables:

TABLE 2.

Results for First Period of 30 Days.

Lot No.	No. of Steers.	Average Weight Oct. 16, Lbs.	Total Feed Eaten Per Head, Lbs.	Total Gain Per Head, Lbs.	Average Daily Gain Per Head. Lbs.	Pounds Feed Per 100 Lbs. Gain.	Cost of Feed Per 100 Lbs. Gain.
I	7	864.2	78.6 cotton seed meal 677.1 cotton seed hulls	153.5	5.11	51.2 cotton seed meal 440.9 cotton seed hulls	$2.23
II	7	837.8	78.6 cotton seed meal 1269.7 silage	156.4	5.21	50.2 cotton seed meal 811.7 silage	$1.69
III	7	884.2	78.6 cotton seed meal 339.6 cotton seed hulls 970.6 silage	150.7	5.02	52.1 cotton seed meal 225.3 cotton seed hulls 644 silage	$2.30
IV	7	825.7	124.4 cotton seed 1123.3 silage	135	4.5	92.2 cotton seed 832.1 silage	$1.82

TABLE 3.

Results for Second Period of 30 Days.

Lot No.	No. of Steers.	Average Weight Nov. 15, Lbs.	Total Feed Eaten Per Head, Lbs.	Total Gain Per Head, Lbs.	Average Daily Gain Per Head, Lbs.	Pounds Feed per 100 Lbs. Gain.	Cost of Feed Per 100 Lbs. Gain.
I	7	1017.8	92.5 cotton seed meal 876.4 cotton seed hulls	70	2.33	132.1 cotton seed meal 1252 cotton seed hulls	$6.16
II	7	994.3	92.5 cotton seed meal 1683.9 silage	34.28	1.14	269.8 cotton seed meal 4911.4 silage	$9.78
III	7	1035.5	92.5 cotton seed meal 450 cotton seed hulls 1255.3 silage	47.14	1.57	196.2 cotton seed meal 954.5 cotton seed hulls 2662.9 silage	$9.32
IV	7	960.7	150.9 cotton seed 1469.6 silage	32.14	1.07	469.5 cotton seed 4572.2 silage	$9.70

TABLE 4.

Results for Third Period of 30 Days.

Lot No.	No. of Steers.	Average Weight Dec. 15, Lbs.	Total Feed Eaten Per Head, Lbs.	Total Gain Per Head, Lbs.	Average Daily Gain Per Head, Lbs.	Pounds Feed Per 100 Lbs. Gain.	Cost of Feed Per 100 Lbs. Gain.
I	7	1087.8	130.7 cotton seed meal 900 cotton seed hulls	47.8	1.59	273 cotton seed meal 1880.6 cotton seed hulls	$10.27
II	7	1028.5	130.7 cotton seed meal 1563.9 silage	55	1.83	237.6 cotton seed meal 2843.5 silage	$6.76
III	7	1082.1	130.7 cotton seed meal 450 cotton seed hulls 1178.2 silage	60	2	217.8 cotton seed meal 750 cotton seed hulls 1963.7 silage	$8.02
IV	7	992.8	215.2 cotton seed 1335.1 silage	70	2.33	307.5 cotton seed 1907.2 silage	$5.00

TABLE 5.

Results for Fourth Period of 30 Days.

Lot No.	No. of Steers.	Average Weight Jan. 14, Lbs.	Total Feed Eaten Per Head, Lbs.	Total Gain Per Head, Lbs.	Average Daily Gain Per Head, Lbs.	Pounds Feed per 100 Lbs. Gain.	Cost of Feed Per 100 Lbs. Gain.
I	7	1135.7	154.2 cotton seed meal 900 cotton seed hulls	68.6	2.28	224.8 cotton seed meal 1312.5 cotton seed hulls	$7.63
II	7	1083.5	154.2 cotton seed meal 1560 silage	35.7	1.19	431.7 cotton seed meal 4368 silage	$11.29
III	7	1142.1	154.2 cotton seed meal 450 cotton seed hulls 1260 silage	50	1.66	308.3 cotton seed meal 900 cotton seed hulls 2520 silage	$10.46
IV	7	1062.8	267.7 cotton seed 1260 silage	14.3	.47	1874.2 cotton seed 8820 silage	$26.95

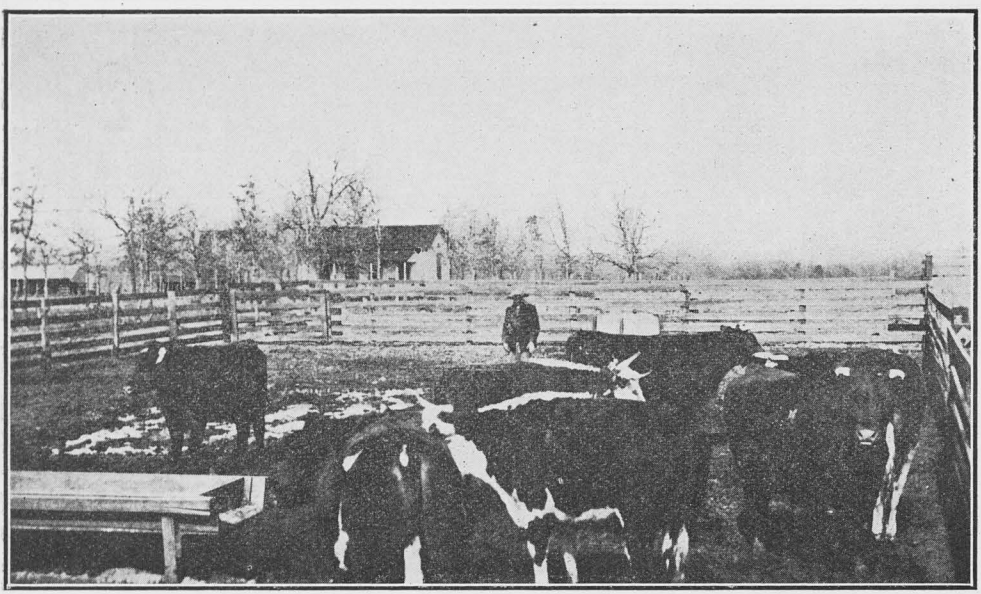

Plate V. The steers of Lot I at the end of the experiment.

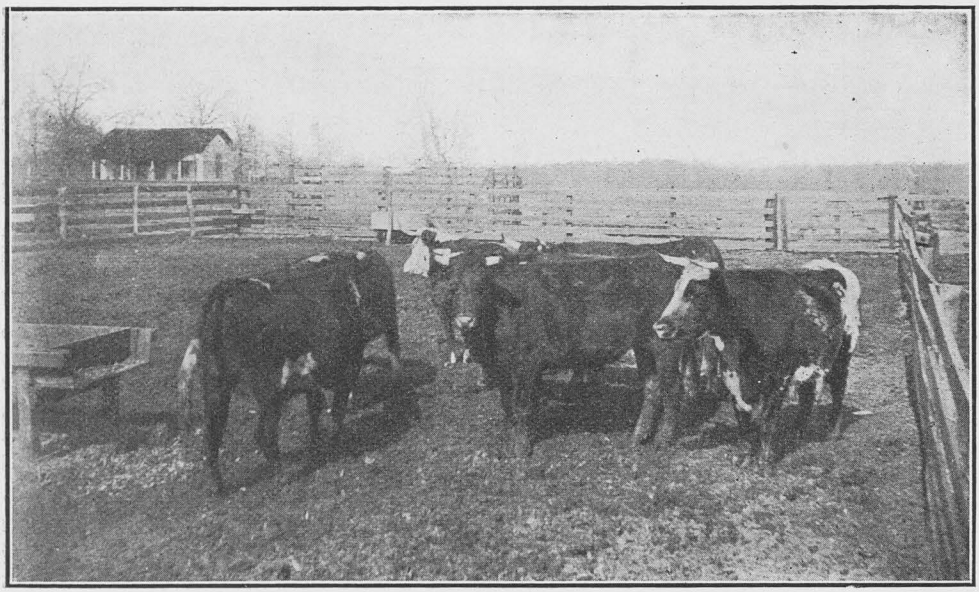

Plate VI. The steers of Lot II at the end of the experiment.

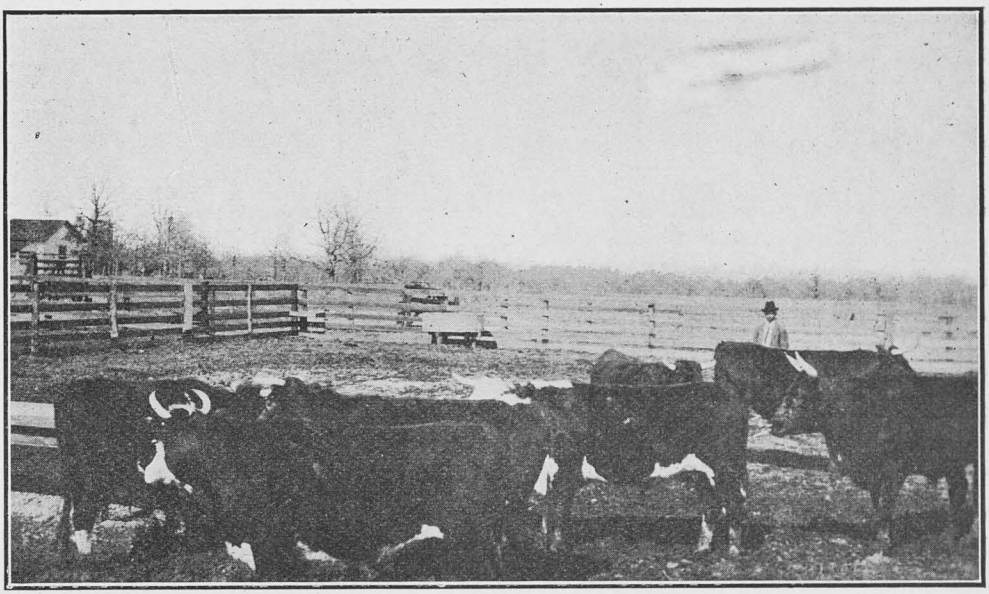

Plate VII. The steers of Lot III at the end of the experiment.

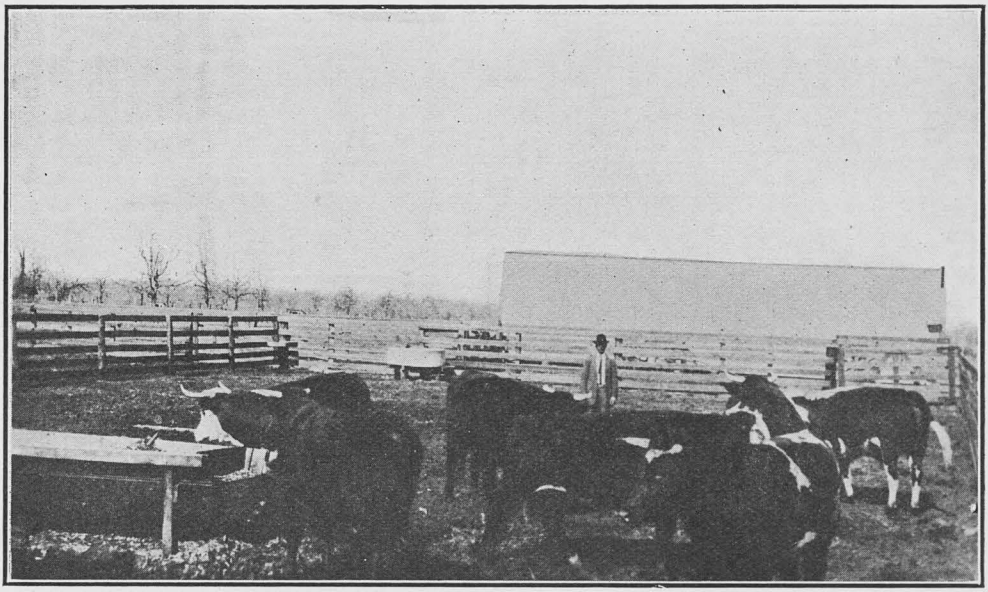

Plate VIII. The steers of Lot IV at the end of the experiment.

TABLE 6.

Results for Fifth Period of 19 Days.

Lot No.	No. of Steers.	Average Weight Feb. 13, Lbs.	Total Feed Eaten Per Head, Lbs.	Total Gain Per Head, Lbs.	Average Daily Gain Per Head, Lbs.	Pounds Feed Per 100 Lbs. Gain.	Cost of Feed Per 100 Lbs. Gain.
I	7	1204.2	114 cotton seed meal 570 cotton seed hulls	22.8	1.2	498.7 cotton seed meal 2493.7 cotton seed hulls	$15.46
II	7	1119.2	114 cotton seed meal 988 silage	37.1	1.95	306.9 cotton seed meal 2660 silage	$7.47
III	7	1192.1	114 cotton seed meal 285 cotton seed hulls 798 silage	39.3	2.06	290.2 cotton seed meal 725.4 cotton seed hulls 2031.3 silage	$8.99
IV	7	1077.1	10.8 cotton seed 107.5 cotton seed meal 935.6 silage	62.8	3.3	17.15 cotton seed 171.02 cotton seed meal 1488.4 silage	$4.31

TABLE 7.

Results for Whole Period of 139 Days.

Lot No.	No. of Steers.	Average Weight Oct. 16, Lbs.	Total Feed Eaten Per Head, Lbs.	Total Gain Per Head, Lbs.	Average Daily Gain Per Head, Lbs.	Pounds Feed per 100 Lbs. Gain.	Cost of Feed Per 100 Lbs. Gain.
I	7	864.2	569.9 cotton seed meal 3923.6 cotton seed hulls	362.8	2.61	157.1 cotton seed meal 1081.3 cotton seed hulls	$5.90
II	7	837.8	569.9 cotton seed meal 7065.6 silage	318.5	2.29	178.9 cotton seed meal 2217.9 silage	$5.19
III	7	884.2	569.9 cotton seed meal 1974.6 cotton seed hulls 5462.1 silage	347.1	2.49	164.2 cotton seed meal 568.8 cotton seed hulls 1573.4 silage	$6.17
IV	7	825.7	769.1 cotton seed 107.5 cotton seed meal 6123.6 silage	314.2	2.26	244.7 cotton seed 34.2 cotton seed meal 1948.4 silage	$4.98

TABLE 8.

Results Showing Comparison of Lot II and Lot IV for Period of 120 Days.

Lot No.	No. of Steers.	Average Weight Oct. 16, Lbs.	Total Feed Eaten Per Head, Lbs.	Total Gain Per Head, Lbs.	Average Daily Gain Per Head, Lbs.	Pounds Feed Per 100 Lbs. Gain.	Cost of Feed Per 100 Lbs. Gain.
II	7	837.8	455.9 cotton seed meal 6077.6 silage	281.4	2.34	162 cotton seed meal 2159.5 silage	$4.89
IV	7	825.7	758.3 cotton seed 5188 silage	251.4	2.09	301.6 cotton seed 2063.4 silage	$5.14

MARKETING.

As previously stated the experiment closed with the morning feed of March 4, 1913, the final weights being taken at the usual hour, between 10 and 11 a. m. In order to put the steers in better shape for shipping the following day, the evening feed of March 4th, was reduced one-half for each lot, making the amounts fed per steer as follows:

Lot I— 1½ pounds cotton seed meal.
7½ pounds cotton seed hulls.

Lot II— 1½ pounds cotton seed meal.
13 pounds silage.

Lot III— 1½ pounds cotton seed meal.
3¾ pounds cotton seed hulls.
10½ pounds silage.

Lot IV— 1½ pounds cotton seed meal.
13 pounds silage.

The morning of March 5th, sorghum hay, and this only, was supplied to all of the lots. They received 10 pounds per steer which was about as much as they could clean up. They had free access to water until they were started for the shipping pens, about a mile distant, about 10:30 a. m. They were loaded about 1 p. m., and shipped to the Fort Worth market, where they were unloaded about 9:30 a. m., March 6th. In order to ascertain the shrinkage that had occurred since the final weights at College Station, each lot was weighed before receiving water or feed, the weighing being done at 11 a. m.

The shrinkage is shown in the following table:

TABLE 9.

Lot No.	Average Weight at College Station March 4.	Average Weight at Fort Worth, March 6.	Shrinkage.
I	1227 lbs.	1050 lbs.	177 lbs.
II	1156 lbs.	1051 lbs.	105 lbs.
III	1231 lbs.	1093 lbs.	138 lbs.
IV	1140 lbs.	1033 lbs.	107 lbs.

It will be seen that the shrinkage in Lot I was unusually large. It was also considerably greater in Lot III than in Lots II and IV, in which it was practically the same. As was previously stated, Lot I, fed meal and hulls and Lot III, fed meal, hulls and silage, ate more salt and drank more water throughout the experiment than the other two lots. Hence, the much greater shrinkage in these lots was most likely due to this fact. In other words, Lots I and III, evidently had a greater fill of water at the time of the final weights at College Station, which, it is reasonable to believe, would naturally cause them to shrink more in shipment.

As soon as the weights to determine the shrinkage had been made the steers were given free access to water and hay until about 3 p. m., when they were weighed to Armour & Co., who purchased them, in separate lots as fed.

The weights of the steers, the "fill" they had taken, and the prices for which they sold are shown in the following table:

TABLE 10.

Lot No.	No. of Steers.	Average Weight	Average Fill	Average Price Per Cwt.	Amount
I	7	1103 lbs.	53 lbs.	$7.37	$81.29
II	7	1096 lbs.	45 lbs.	7.37	80.77
III	7	1137 lbs.	44 lbs.	7.37	83.80
IV	7	1061 lbs.	28 lbs.	7.36	78.09

It will be seen that all of the cattle, and especially Lots I, II, and III, took on a good fill. Each lot really sold in two parts on account of two steers in each that did not measure up with the others in quality and finish. The prices given in the table are, therefore, averages of the prices actually received, which were as follows:

Lot I—5 steers 5730 pounds at $7.50 per cwt.....$429.75
2 steers 1990 pounds at 7.00 per cwt..... 139.30
Lot II—5 steers 5680 pounds at 7.50 per cwt..... 426.00
2 steers 1990 pounds at 7.00 per cwt..... 139.30
Lot III—5 steers 5950 pounds at 7.50 per cwt..... 446.25
2 steers 2010 pounds at 7.00 per cwt..... 140.70
Lot IV—5 steers 5350 pounds at 7.50 per cwt..... 401.25
2 steers 2080 pounds at 7.00 per cwt..... 145.60

The fact that all of the lots sold alike is evidence that the buyers considered that there was practically no difference among them.

SLAUGHTER TEST.

The slaughter records of the four lots, furnished us through the kindness of Armour & Company, were as follows:

Lot No.	Average Weight Dressed.	Dressing Per Cent.	Average Dressing Per Cent.
Lot I—5 steers	672 pounds	58.64	58.03
2 steers	560 pounds	56.28	
Lot II—5 steers	768 pounds	59.68	59.19
2 steers	575 pounds	57.79	
Lot III—5 steers	702 pounds	59.00	58.92
2 steers	590 pounds	58.70	
Lot IV—5 steers	626 pounds	58.50	58.54
2 steers	610 pounds	58.65	

The following communication from Armour & Company indicates their estimate of the cattle, dressed and in the cooler:

FORT WORTH, TEXAS, March 20, 1913.

Prof. J. C. Burns, College Station, Texas.

DEAR SIR:—Referring to killing test on four lots of experiment steers, which we killed. In the beef Lot No. 2 seemed to be better finished, smoother and best color in the beef. Your Lot No. 4 was second choice, your Lot No. 1, third, and your Lot No. 3 fourth.

There was quite a similarity in all of these lots, in that they each had one or more good individual carcasses. All of the four lots would practically grade alike on the beef market.

We should be pleased to receive copy of bulletin covering feeding, etc., on these cattle when issued.

Yours truly,

ARMOUR & COMPANY.

FINANCIAL OUTCOME.

An itemized statement of the financial results of the experiment is shown in the following table:

TABLE 11.

	Lot I	Lot II	Lot III	Lot IV
Number of steers	7	7	7	7
Average weight at beginning of experiment—pounds	864	838	884	826
Cost per steer at beginning of experiment, at $4.95 per Cwt	$42.77	$41.48	$43.76	$40.99
Cost of feed consumed per steer during experiment	21.43	16.52	21.43	15.64
Cost of feed consumed per steer preparatory to shipping	.10	.09	.10	.09
Freight charge per steer in marketing	1.87	1.87	1.87	1.87
Cost of yardage per steer on market	.25	.25	.25	.25
Cost of hay per steer on market	.05	.05	.05	.05
Commission per steer in selling	.50	.50	.50	.50
Total cost per steer	$66.97	$60.76	$67.96	$59.39
Selling price per steer	$81.29	$80.77	$83.80	$78.09
Net profit per steer	14.32	20.01	15.84	18.70
Increase in selling price of steers, per hundred weight, above initial cost, necessary to break even	$ 1.12	$ .59	$ 1.02	$ .64

It will be observed that Lot II, fed cotton seed meal and silage throughout the experiment, gave the most profitable returns and that Lot IV, first fed cotton seed and silage and later cotton seed meal and silage, stood next in this respect. Lot I, fed cotton seed meal and cotton seed hulls, was the least profitable. The returns from Lot III, fed meal, hulls and silage, were somewhat better than those from Lot I, but considerably less than those from Lot II. In other words, though the ration of meal, hulls and silage proved somewhat more profitable than the ration of meal and hulls, it was considerably less profitable than the ration of meal and silage.

The cost of the labor and hauling necessary to conduct the experiment, the cost of the salt consumed, and the value of the manure were not included in the above statement. It being necessary to weigh the rations

each day and feed each lot separately, the labor was of course greater than it would be in feeding the same number of steers under ordinary farm conditions. The manure, accumulated during the experiment, was not measured or analyzed but, according to experiments in which this was done, it is safe to say that its fertilizing value was sufficient to considerably more than offset the items of salt, labor and hauling.

DISCUSSION OF RESULTS.

Silage Compared with Cotton Seed Hulls.—Referring to Table 7, which gives the results of the experiment for the whole period of 139 days, we find that Lot I, fed meal and hulls, made the largest gain, followed by Lots III and II, in the order named. Of these three lots, however, the cost of feed per 100 pounds gain was least in Lot II, fed meal and silage and greatest in Lot III, fed meal, hulls and silage. The gains shown in this table are based on the final weights at College Station. Computed on the basis of the final weights at Fort Worth we find that Lot I gained 239 pounds per head; Lot II, 258 pounds per head; and Lot III, 253 pounds per head. Hence, on this basis, the meal and silage ration produced both the largest and cheapest gain of the three lots, the ration of meal, hulls and silage ranking next, and that of meal and hulls ranking last. The results indicate, therefore, that the ration of meal and silage is considerably superior to the others from practically every standpoint. If one has plenty of silage, there appears to be no advantage in feeding cotton seed hulls in connection with it. On the other hand, there does appear to be quite an advantage in a ration of meal, hulls, and silage over one of straight meal and hulls. The financial results would, of course, be modified in accordance with the prices for hulls and silage.

Again taking the final weights at Fort Worth as a basis for computing the total gain per head, we find that in Lot I, 569.9 pounds cotton seed meal and 3923.6 pounds cotton seed hulls produced 239 pounds gain and that in Lot II the same amount of cotton seed meal and 7065.6 pounds silage produced 258 pounds gain. Therefore, 1.67 tons of silage was equivalent to 1 ton of cotton seed hulls in feeding value.

With cotton seed meal at $27.00 per ton and other items of expense as already stated, Lot I paid $14.30 per ton for cotton seed hulls and Lot II, $8.16 per ton for silage.

Cotton Seed Meal Compared with Cotton Seed.—Referring to Table 8 and comparing the ration of cotton seed meal and silage, fed Lot II, with that of cotton seed and silage, fed Lot IV for 120 days, it will be seen that the former produced the larger and cheaper gain. As already stated, Lot IV, at the end of 120 days was changed to a ration of cotton seed meal and silage, this being done on account of the fact that this lot of steers had been scouring rather badly for several days. Three days were taken to make the substitution of meal for seed complete, and this fact accounts for the small amount of seed appearing in the last period. The large daily gain of 3.3 pounds a head and the low cost of $4.31 for feed per 100 pounds gain for the last period of 19 days, when during the previous period of 120 days the daily gain had been only 2.09 pounds a head and the cost of feed per 100 pounds

gain $5.14, show still further the superiority of the ration of meal and silage over that of seed and silage. It is evident, therefore, that cotton seed meal at $27.00 per ton, is more profitable than cotton seed at $17.00 per ton for fattening cattle.

The Ration of Cotton Seed Meal and Silage.—Two experiments have been conducted by the Station during the past two years in which the value of cotton seed meal and silage was tested for fattening cattle. The results of these experiments, those obtained by other stations, and by commercial feeders along the same line, indicate this combination to be one of the most profitable rations that can be used for feeding cattle in this State. It is, also, one that is within reach of practically every farmer. More and more in the future, the beef supply of the United States must be produced on the small farm, for large ranches and cheap grass are fast becoming things of the past. Indian corn, Kafir corn, milo maize and sorghum, some of which are best adapted to one section of the State and some to another, are all excellent crops for the silo. They rarely ever fail to develop sufficiently but that they may be converted into silage to advantage, and as a rule, at only a moderate cost of production. Furthermore, converting such crops into silage practically always insures saving them, provided of course, the silo is properly constructed.

The time is fast approaching when many farmers of the State will realize the necessity of doing something to replenish the fertility of their land. It will be found, that for many of them, the most practical and profitable method of accomplishing this will be the keeping of a small, well improved herd of beef cattle on the farm. Though many kinds of feeds produced on the farm may be fed profitably to these cattle, as a rule, none will prove more economical than silage. In purchasing cotton seed meal of good quality with which to supplement it, one is not only getting one of the best commercial feeds that can be bought, but also one of high fertilizing value. Therefore, the farmer, who keeps a small herd of good cattle, produces silage, purchases cotton seed meal to feed with it, and saves and distributes the manure on his fields, will not only realize a direct profit on his feed through the sales of his cattle, but, at the same time, will increase the productiveness of his lands. This holds true not only for the small farm but for the large one, as well.

Silage has proven to be an excellent feed not only in a fattening ration, but for growing and breeding animals also. Its succulent character makes it of special value for such animals, in the absence of green pasture. It should be supplemented, however, with a small amount of cotton seed meal or some other feed rich in protein, in order to obtain the best results. Yearling cattle receiving from 2 to 2½ pounds of meal per head daily in connection with silage should make good growth.

Though it is believed that the price of $2.50 per ton for silage, which was the price used in calculating the financial results of this experiment, will cover the average cost of producing silage on Texas farms, the cost of production will, of course, vary with conditions. On this account the following statement is given to show what the financial outcome would have been in Lot II, at different prices for silage:

The net profit per head on Lot II with silage at

$2.00 per ton would have been	$21.77
3.00 per ton would have been	18.24
4.00 per ton would have been	14.71
5.00 per ton would have been	11.18
6.00 per ton would have been	7.65
7.00 per ton would have been	4.11

OUTLINE FOR ARRIVING AT THE COST OF PRODUCING SILAGE.

..... Acres	Dr.	Cr.
Plowing (breaking) at $..... per acre.....		
Discing at $..... per acre.....		
Harrowing at $..... per acre.....		
Commercial fertilizer ..... lbs. at $..... per acre.....		
Other fertilizer ..... lbs. at $..... per acre.....		
Planting at $..... per acre.....		
Seed at $..... per acre.....		
First cultivation at $..... per acre.....		
Second cultivation at $..... per acre.....		
Third cultivation at $..... per acre.....		
Fourth cultivation at $..... per acre.....		
Fifth cultivation at $..... per acre.....		
Harrowing at $..... per acre.....		
Harvesting (row binder) at $..... per acre.....		
Hauling to silo $..... per ton, $..... per acre.....		
Cutting, and filling silo at $..... per ton, $..... per acre.		
Interest on investment in silo, engine, and cutter at ..... per cent..		
Depreciation on silo, engine, and cutter at 10 per cent.....		
Rent of land at $..... per acre.....		
Taxes on land, implements, silo, engine, and cutter.....		
Depreciation of fences, at.....per cent.....		
Total cost of producing ..... tons silage from .....acres at $..... per ton.....		
Total feeding value of ..... tons silage from ..... acres at $..... per ton.....		
Total profit or loss, per ton $....., per acre $.....		

NOTE: Many farmers fail to consider the value of their own labor in figuring the cost of producing crops. This, as well as all other items of expense connected with the production of a particular crop should be included. The rent of the land planted to the crop, whether the land is owned by the farmer or not should be figured as an item of expense, from the fact that in working his own land he should be able to make the amount for which it would rent. In figuring the depreciation of fences surrounding an area planted to a certain crop it is necessary to know their value and to estimate the length of time they will last. For example, the depreciation of a fence estimated to last ten years should be figured at 10 per cent.

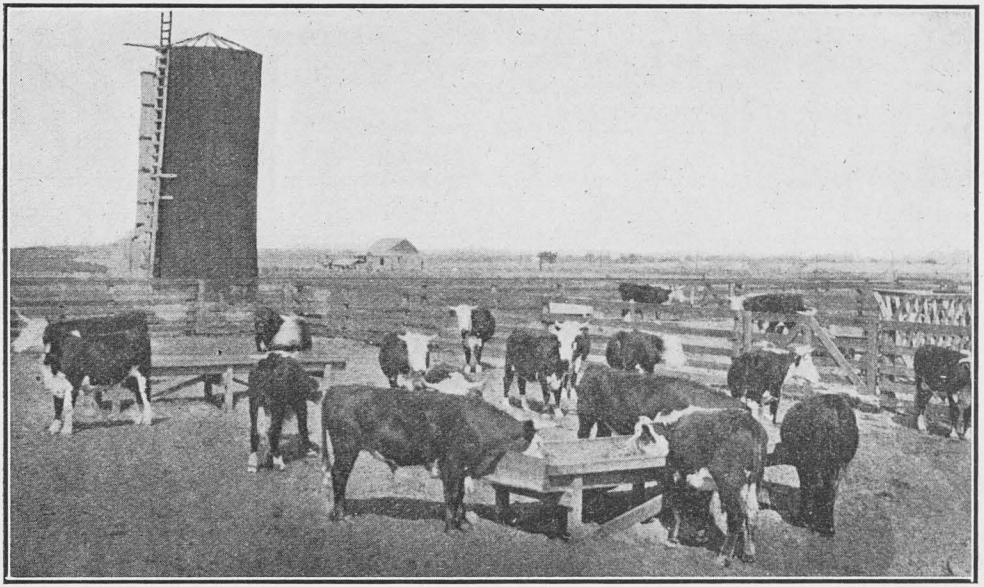

Plate IX. The steers of Lot V at the beginning of the experiment.

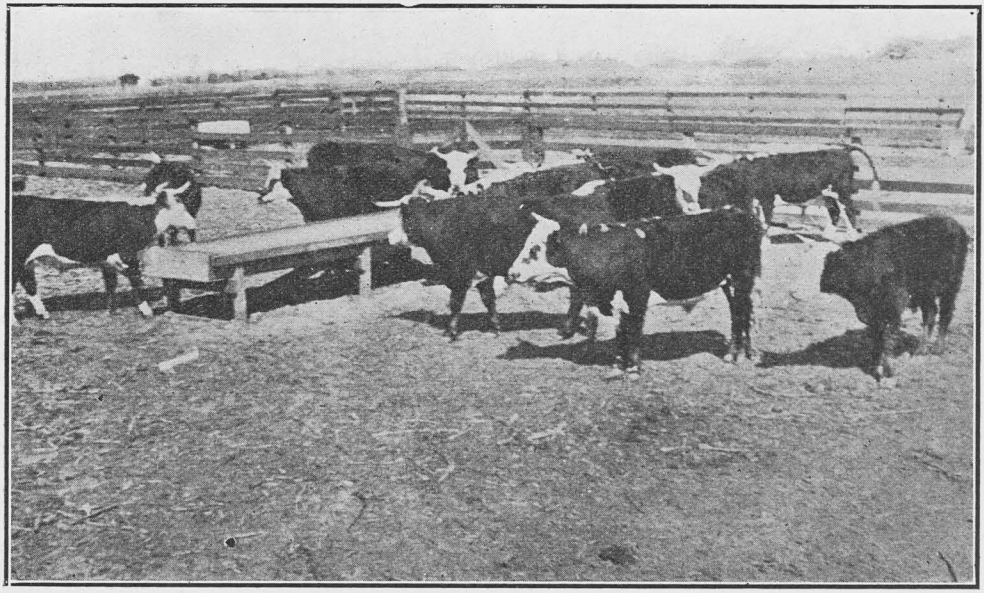

Plate X. The steers of Lot VI at the beginning of the experiment.

SORGHUM HAY COMPARED WITH COTTON SEED HULLS FOR FATTENING CATTLE.

OBJECT OF EXPERIMENT.

The basal ration used in this test consisted of cotton seed meal, either ground Kafir corn or milo maize, and silage. The purpose, therefore, was to compare sorghum hay and cotton seed hulls as supplements to this ration.

CATTLE USED.

The cattle used were 32 head of range-bred, high grade Hereford steers, two years past in age. Thirty of them were raised in Coleman county and were purchased from Boog-Scott Bros. Two were raised in Nueces county and were purchased from Mrs. H. M. King, with the 28 head used in the experiment already described. They were a fairly uniform lot, most of them of very good feeder conformation and above the average in quality. All were rather thin in condition, but thrifty when the experiment began. The thirty steers purchased from Boog-Scott Bros. cost us $45.00 a head, f. o. b. Coleman. The two steers purchased from Mrs. H. M. King, though costing only $40.00 a head, are figured at the same price as the others, for the sake of uniformity. Including freight charges to College Station, the cost of the cattle at the beginning of the experiment was $46.13 a head. Their average weight at this time was 776½ pounds, thus making the price $5.94 a hundred weight.

FEEDS USED.

The feeds used during the test and the prices paid for them were as follows:

Cotton seed meal	$27.00 per ton
Threshed milo maize (ground)	25.00 per ton
Kafir heads (ground)	20.00 per ton
Threshed Kafir corn (ground)	25.00 per ton
Silage	2.50 per ton
Cotton seed hulls	7.00 per ton
Sorghum hay	12.00 per ton

The cotton seed meal, silage, and cotton seed hulls were of the same quality as used in the experiment already described, their composition being given in Table 1. The average analyses of the other feeds, also determined by the Chemistry Division of the Experiment Station, are shown in the following table:

TABLE 12.

Feeds.	Percentage Composition						Analysis Numbers
	Water	Ash	Protein	Crude Fiber	Nitrogen Free Extract	Fat	
Threshed Milo Maize	9.67	1.08	12.18	1.42	72.94	2.71	6873
Kafir Heads	13.34	2.58	10.21	5.33	66.68	1.84	6878–6946
Threshed Kafir Corn	12.28	1.64	10.88	2.53	70.27	2.38	6944–7010–7009
Sorghum Hay	7.80	5.70	3.88	27.28	52.97	2.37	6943

PLAN OF EXPERIMENT.

The morning of October 16, 1912, the steers were divided into two lots, designated as Lot V and Lot VI, each containing 16 head. The division was made very equally with regard to type, quality, condition and weight.

The two pens in which the lots were fed were each 60 x 100 feet in area and equal in all respects. Water and salt were amply provided in the same way as described for the lots used in the other experiment. From the beginning of the experiment until January 6, the two lots had no shelter, whatever. Thereafter, each was protected by a shed, 14 x 36 feet, open on the south side. The cattle were, of course, subjected to the same weather conditions that have already been described.

The two lots were fed as follows:

Lot V—Cotton seed meal, ground milo maize or Kafir corn, cotton seed hulls and silage.

Lot VI—Cotton seed meal, ground milo maize or Kafir corn, sorghum hay, and silage.

The rations were carefully weighed and supplied to the cattle in two parts, one early in the morning and the other late in the afternoon. All of the feeds were thoroughly mixed together in the feed troughs, with the exception of the sorghum hay for Lot VI, which was placed in a rack.

Thirty-five hogs, mixed barrows and sows of rather thin flesh and of various sizes, a number of them shoats weighing at the start only 50 to 65 pounds, were used to follow the steers and work over the droppings, which constituted the only feed they received. They were purchased in Brazos county, in three different bunches and at different times during the progress of the experiment. They were of mixed breeding, most of them carrying a fair percentage of Poland-China or Duroc-Jersey blood. All of them were at liberty to go from one pen to the other.

The two lots of steers were weighed at the same time throughout the experiment as were Lots I, II, III and IV.

THE FEEDING TEST.

The experiment lasted 139 days, from the evening feed of October 16, 1912, to the morning feed of March 4, 1913.

The rations per steer at the beginning were as follows:

Lot V.— 2 pounds cotton seed meal.
4 pounds milo maize chops.
12 pounds silage.
10 pounds cotton seed hulls.

Lot VI.— 2 pounds cotton seed meal.
4 pounds milo maize chops.
12 pounds silage.
10 pounds sorghum hay.

The cattle took to their rations readily, and at no time during the test was there a steer in either lot "off feed" or affected with scours. After only two or three days the cotton seed meal, grain and silage in both lots were gradually increased, but at no time during the experiment was the cotton seed hulls and sorghum hay more than 10 pounds a head daily. On December 16, it was found necessary to begin a gradual reduction in these two feeds, from the fact that the other portion of the rations, especially the meal and grain, had been increased to such an extent, that the cattle could no longer eat as much roughage as they had been eating. After February 15, the hulls and hay were left off altogether, silage being the only roughage fed for the rest of the period.

Milo maize chops was fed from the beginning of the experiment until November 24, after which ground Kafir corn heads was substituted for it and used until December 4. After this, threshed ground Kafir corn or Kafir corn chops was fed, with the exception of two days, viz: December 17, and 19, on which ground heads was again fed. The change from sorghum-cowpea silage to corn silage took place on February 1, the same as in the other experiment.

The following is a statement showing the weights and prices of the hogs when they were turned in the pens to follow the steers:

October 30—	9 hogs—	750 pounds at	$6.75 per cwt.	$50.60
November 7—	11 hogs—	1245 pounds at	5.00 per cwt.	62.25
December 27—	15 hogs—	1150 pounds at	6.00 per cwt.	69.00
Total..	..35 hogs—	3145 pounds at	$5.78 per cwt.	$181.85

Had all of these hogs been shoats weighing at the start from 100 to 125 pounds each, and there had been one to each steer throughout the test, they should have been of better size and finish when marketed and, therefore, should have commanded a better price than they actually sold for. As already stated, however, many of them were very small at the start and, hence, were not of sufficient size to more than classify as pigs when marketed.

Special notice was taken to see if the cotton seed meal being fed to the steers would have any bad effects on the hogs. Though, the meal had been gradually increased until on January 7 it reached 4 pounds per steer daily and so remained until the end of the experiment, at no time were there any hogs that seemed to be sick or unthrifty. Two sows of the lot proved to be with pig and on March 25, near the time

for them to farrow, they were weighed and removed from the pens. The two together weighed 350 pounds. Both of them, a few days later, farrowed strong, healthy litters. Apparently, therefore, eating the droppings from steers fed cotton seed meal had no bad effects on the sows and pigs, either before or after farrowing.

The average of the rations fed the steers of each lot for each period of the experiment was as follows:

First period—30 days.

Lot V.— 2.6 lbs. cotton seed meal.
7.1 lbs. milo maize chops.
10 lbs. cotton seed hulls.
18.3 lbs. silage.

Lot VI.— 2.6 lbs. cotton seed meal.
7.1 lbs. milo maize chops.
10 lbs. sorghum hay.
18.3 lbs. silage.

Second period—30 days.

Lot V.— 3.1 lbs. cotton seed meal.
13 lbs. grain.
10 lbs. cotton seed hulls.
20.3 lbs. silage.

Lot VI.— 3.1 lbs. cottonseed meal.
13 lbs. grain.
10 lbs. sorghum hay.
20.3 lbs. silage.

Third period—30 days.

Lot V.— 3.6 lbs. cotton seed meal.
16 lbs. grain.
6.9 lbs. cotton seed hulls.
18.5 lbs. silage.

Lot VI.— 3.6 lbs. cotton seed meal.
16 lbs. grain.
6.9 lbs. sorghum hay.
18.5 lbs. silage.

Fourth period—30 days.

Lot V.— 4 lbs. cotton seed meal.
18 lbs. Kafir chops.
3.2 lbs. cotton seed hulls.
17.1 lbs. silage.

Lot VI.— 4 lbs. cotton seed meal.
18 lbs. Kafir chops.
3.2 lbs. sorghum hay.
17.1 lbs. silage.

Fifth period—19 days.

Lot V.— 4 lbs. cotton seed meal.
18 lbs. Kafir chops.
0.24 lbs. cotton seed hulls.
17 lbs. silage.

Lot VI.— 4 lbs. cotton seed meal.
18 lbs. Kafir chops.
0.24 lbs. sorghum hay.
17 lbs. silage.

The results of the experiment are shown in detail in the following tables:

TABLE 13.

Results for First Period of 30 Days.

Lot No.	No. of Steers.	Average Weight Oct. 16, Lbs.	Total Feed Eaten Per Head, Lbs.	Total Gain Per Head, Lbs.	Average Daily Gain Per Head, Lbs.	Pounds Feed Per 100 Lbs. Gain.	Cost of Feed Per 100 Lbs. Gain.
V	16	777.5	79.2 cotton seed meal 214.2 milo maize chops 300 cotton seed hulls 548.9 silage	150.9	5.03	52.5 cotton seed meal 141.9 milo maize chops 198.7 cotton seed hulls 363.7 silage	$3.63
VI	16	775.6	79.2 cotton seed meal 214.2 milo maize chops 300 sorghum hay 548.9 silage	133.7	4.46	59.2 cotton seed meal 160.2 milo maize chops 224.3 sorghum hay 410.4 silage	$4.66

TABLE 14.

Results for Second Period of 30 Days.

Lot No.	No. of Steers.	Average Weight Nov. 15, Lbs.	Total Feed Eaten Per Head, Lbs.	Total Gain Per Head, Lbs.	Average Daily Gain Per Head, Lbs.	Pounds Feed Per 100 Lbs. Gain.	Cost of Feed Per 100 Lbs. Gain.
V	16	928.4	92.5 cotton seed meal 391.4 grain 300 cotton seed hulls 609.4 silage	78.7	2.62	117.5 cotton seed meal 298.6 maize & kafir chops 198.4 Kafir heads (ground) 380.9 cotton seed hulls 773.8 silage	$9.60
VI	16	909.3	92.5 cotton seed meal 391.4 grain 300 sorghum hay 609.4 silage	95.6	3.18	96.7 cotton seed meal 245.9 maize & kafir chops 163.4 Kafir heads (ground) 313.7 sorghum hay 637.2 silage	$8.69

TABLE 15.

Results for Third Period of 30 Days.

Lot No.	No. of Steers.	Average Weight Dec. 15, Lbs.	Total Feed Eaten Per Head, Lbs.	Total Gain Per Head, Lbs.	Average Daily Gain Per Head, Lbs.	Pounds Feed Per 100 Lbs. Gain.	Cost of Feed Per 100 Lbs. Gain.
V	16	1007.1	109.2 cotton seed meal 479 grain 206 cotton seed hulls 556.1 silage	73.4	2.44	148.8 cotton seed meal 609.7 Kafir chops 42.5 Kafir heads (ground) 280.5 cotton seed hulls 757.2 silage	$11.98
VI	16	1005	109.2 cotton seed meal 479 grain 206 cotton seed hulls 556.1 silage	84.4	2.81	129.5 cotton seed meal 530.7 Kafir chops 37 Kafir heads (ground) 244.1 sorghum hay 659.1 silage	$11.04

TABLE 16.

Results for Fourth Period of 30 Days.

Lot No.	No. of Steers.	Average Weight Jan. 14, Lbs.	Total Feed Eaten Per Head, Lbs.	Total Gain Per Head, Lbs.	Average Daily Gain Per Head, Lbs.	Pounds Feed per 100 Lbs. Gain.	Cost of Feed Per 100 Lbs. Gain.
V	16	1080.6	120 cotton seed meal 540 Kafir chops 95.5 cotton seed hulls 512.1 silage	51.9	1.73	231.3 cotton seed meal 1041 Kafir chops 184.1 cotton seed hulls 987.1 silage	$18.01
VI	16	1089.3	120 cotton seed meal 540 Kafir chops 95.5 sorghum hay 512.1 silage	58.4	1.95	205.3 cotton seed meal 913.4 Kafir chops 163.4 sorghum hay 876.2 silage	$16.26

TABLE 17.

Results for Fifth Period of 19 Days.

Lot No.	No. of Steers.	Average Weight Feb. 13, Lbs.	Total Feed Eaten Per Head, Lbs.	Total Gain Per Head, Lbs.	Average Daily Gain Per Head, Lbs.	Pounds Feed Per 100 Lbs. Gain.	Cost of Feed Per 100 Lbs. Gain.
V	16	1132.5	76 cotton seed meal 342 Kafir chops 4.5 cotton seed hulls 323 silage	58.1	3.05	130.7 cotton seed meal 588.4 Kafir chops 7.7 cotton seed hulls 555.7 silage	$9.84
VI	16	1147.8	76 cotton seed meal 342 Kafir chops 4.5 sorghum hay 323 silage	59.4	3.12	128 cotton seed meal 576 Kafir chops 7.6 sorghum hay 544 silage	$9.65

TABLE 18.

Results for Whole Period of 139 Days.

Lot No.	No. of Steers.	Average Weight Oct. 16, Lbs.	Total Feed Eaten Per Head, Lbs.	Total Gain Per Head, Lbs.	Average Daily Gain Per Head, Lbs.	Pounds Feed per 100 Lbs. Gain.	Cost of Feed Per 100 Lbs. Gain.
V	16	777.5	477 cotton seed meal 318.1 milo maize chops 187.5 Kafir heads (ground) 1461 Kafir chops 906 cotton seed hulls 2549.4 silage	413.1	2.97	115.5 cotton seed meal 77 milo maize chops 45.4 Kafir heads (ground) 353.6 Kafir chops 219.3 cotton seed hulls 617.1 silage	$8.93
VI	16	775.6	477 cotton seed meal 318.1 milo maize chops 187.5 Kafir heads (ground) 1461 Kafir chops 906 sorghum hay 2549.4 silage	431.6	3.1	110.5 cotton seed meal 73.7 milo maize chops 43.4 Kafir heads (ground) 338.5 Kafir chops 209.9 sorghum hay 590.7 silage	$9.08

TABLE 19.

Results for Period of 120 Days during which Cotton Seed Hulls and Sorghum Hay were Fed.

Lot No.	No. of Steers.	Average Weight Oct. 16, Lbs.	Total Feed Eaten Per Head, Lbs.	Total Gain Per Head, Lbs.	Average Daily Gain Per Head, Lbs.	Pounds Feed Per 100 Lbs. Gain.	Cost of Feed Per 100 Lbs. Gain.
V	16	777.5	401 cotton seed meal 318.1 milo maize chops 187.5 Kafir heads (ground) 1119 Kafir chops 901.5 cotton seed hulls 2226.4 silage	355	2.95	112.9 cotton seed meal 89.6 milo maize chops 52.8 Kafir heads (ground) 315.2 Kafir chops 253.9 cotton seed hulls 627.2 silage	$8.78
VI	16	775.6	401 cotton seed meal 318.1 milo maize chops 187.5 Kafir heads (ground) 1119 Kafir chops 901.5 sorghum hay 2226.4 silage	372.2	3.1	107.7 cotton seed meal 85.5 milo maize chops 50.4 Kafir heads (ground) 300.6 Kafir chops 242.2 sorghum hay 598.2 silage	$8.98

Referring to Table 19, it will be seen that Lot VI, fed sorghum hay, gained 372.2 pounds a head during the 120 days and that Lot V, fed cotton seed hulls, gained only 355 pounds a head. Each lot had consumed the same amount of feed. Hence, the difference in gain in favor of Lot VI must be attributed to the slight superiority of the sorghum hay over the cotton seed hulls, 100 pounds of hay being equivalent to approximately 105 pounds of hulls. Judging from the amount of digestible nutrients—protein, carbohydrates and fat—in the two feeds, it is reasonable to expect that, if sorghum hay were chopped or cut into small pieces, thereby requiring less energy in masticating it than when fed as hay, it would show a greater superiority over cotton seed hulls than the results of this experiment indicate. Whether, when the expense

of cutting the hay is considered, the difference would be sufficient to make the hay at $12.00 a ton as profitable as the hulls at $7.00 a ton is a question. It will be noted that in this experiment the cost of feed per 100 pounds gain during the period of 120 days was 20 cents less in Lot V, fed hulls, than in Lot VI, fed sorghum hay.

A point of special interest and importance in connection with the experiment was the effectiveness of both rations that were used. The average daily gain of 2.97 and 3.1 pounds respectively for the period of 139 days may be considered unusually good.

MARKETING.

The evening of March 4, the feed for both lots of steers was reduced one half, preparatory to shipping them the following day. The amounts fed per steer were as follows:

Lot V.—1 pound cotton seed meal.
4.5 pounds Kafir corn chops.
4.25 pounds silage.

Lot VI.—1 pound cotton seed meal.
4.5 pounds Kafir corn chops.
4.25 pounds silage.

On the morning of March 5, the only feed given was 10 pounds of sorghum hay for each steer. At 1 p. m. the two lots were loaded for shipment to Fort Worth along with the steers used in the other experiment, and were unloaded there about 10:30 a. m., March 6. As it was our purpose to show 15 head of these steers, selected from both lots, in the car lot competition of the National Feeders' and Breeders' Show the following week, only 14 head were sold on March 6, thus leaving 18 head until Monday, March 10, when 3 others were sold. The 15 head that were held over for show were sold Thursday, March 13.

The following table gives an account of the sales:

Number of Steers.	Total Weights Lbs.	Price Per Cwt.	Total Amount.	Average Weight Lbs.	Price Per Head.
14	14830	$7 70	$1141 91	1059	$81.56
3	3375	8 00	270 05	1160	90.01
15	16890	9 00	1520 10	1126	101.34
32	35095	$8 35	$2932 06	1097	$91.63

The 15 head of steers that were shown, dressed 66.02 per cent. Swift & Company, who purchased them, stated in a letter to the writer as follows: "These cattle were very fine indeed, and yield on the 15 lot of steers is the highest yield of any of the car loads of show cattle." A report as to the dressing percentage of the remaining 17 head was not obtained.

FINANCIAL OUTCOME.

The following table gives an itemized statement of the financial results of the experiment, hogs not included:

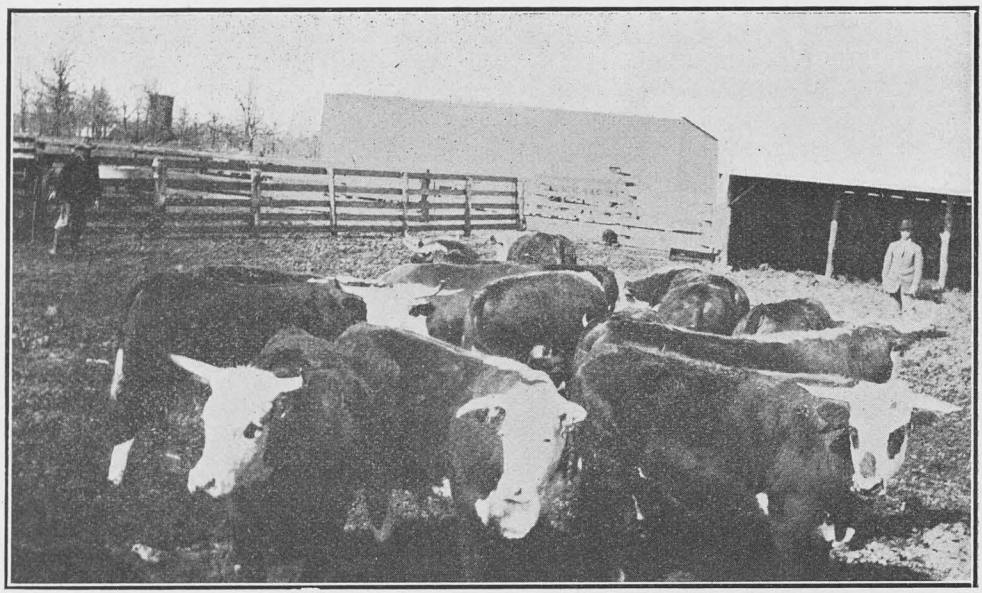

Plate XI. The steers of Lot V at the end of the experiment.

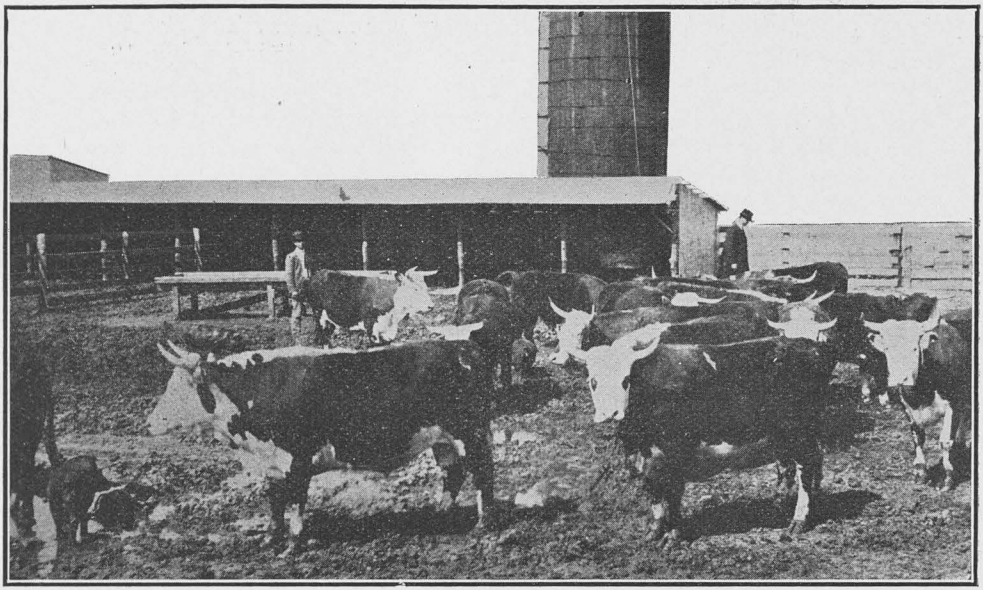

Plate XII. The steers of Lot VI at the end of the experiment.

TABLE 21.

	Lot V	Lot VI
Number of steers	16	16
Average weight at beginning of experiment—pounds	777.5	775.5
Cost per steer at beginning of experiment, at $5.94 per Cwt.	$46.18	$46.06
Cost of feed consumed per steer during experiment	36.91	39.17
Cost of feed consumed per steer preparatory to shipping	.14	.14
Freight charge per steer in marketing	1.99	1.99
Cost of yardage per steer on market	.25	.25
Cost of hay per steer on market	.05	.05
Commission per steer in selling	.50	.50
Total cost per steer	$86.02	$88.16
Selling price per steer	$90.88	$92.26
Net profit per steer	4.86	4.10
Increase in selling price of steers, per hundred weight, above initial cost, necessary to break even. (Hogs not considered.)	$1.96	$2.03

The above statement is based on the assumption that the shrinkage or difference between the final weights at College Station and the selling weights at Fort Worth, was the same for both lots. The average weight at College Station for Lot V was 1190.6 pounds and for Lot VI 1207.2 pounds. The total shrinkage on the two lots was 3270 pounds or 102.1 pounds a head. This being true, Lot V, when sold, averaged 1088.5 pounds and Lot VI, 1105.1 pounds.

The 33 hogs, remaining after the two "piggy" sows were taken out of the experiment, were shipped to Fort Worth at the same time as were the steers. According to the final weights at College Station, the total gain made by the 35 head was 1605 pounds. The total weight at the beginning was 3145 pounds; the two sows taken out March 25, weighed 350 pounds; and the remaining 33 head on March 4, weighed 4400 pounds. The total weight of the 33 head on the Fort Worth market March 6, when they were sold, was 3390 pounds, thus showing a shrinkage of 1010 pounds or 30.6 pounds a head. The price received for them was $7.75 per cwt., which, allowing for 20 pounds dock on a sow, amounted to $307.67. Assuming that the two "piggy" sows had been sold on the same basis and allowing the same amount of shrinkage on them as on the others, thus making them weigh on the Fort Worth market 289 pounds, amounting to $22.40, the gross returns from the 35 head would have been $330.07. After deducting the expenses of marketing, the net proceeds from the 33 head were $286.35. From the 35 head there would have been approximately $308.45.

The total cost of the hogs at the start having been $181.85, the net profit was, therefore, $126.60. Credited to the 32 steers, this means that they returned $3.95 a head through the hogs, thus making the net profits from Lot V, $8.81 a head and from Lot VI, $8.05 a head.

SUMMARY.

1. Though all were fed profitably, the ration of cotton seed meal and silage was considerable more profitable than either the ration of cotton seed meal and hulls or the one of cotton seed meal, hulls, and silage.
2. One and two-thirds tons of silage was found to be equivalent to one ton of cotton seed hulls in feeding value.
3. Lot I paid $14.30 per ton for cotton seed hulls and Lot II, $8.16 per ton for silage.
4. Cotton seed meal at $27.00 per ton was more profitable than cotton seed at $17.00 per ton in supplementing silage to form a fattening ration.
5. The shrinkage in shipment to market was much greater in Lots I and III, that were fed cotton seed hulls, especially in Lot I, than in Lots II and IV, that were fed only silage as roughage.
6. Though the dressing percentages of Lots I, II, III, and IV did not differ much, the highest yield was in Lot II, fed meal and silage, and the lowest was in Lot I, fed meal and hulls.
7. One hundred pounds of sorghum hay was equivalent to 105 pounds of cotton seed hulls in feeding value.
8. Though yielding a slightly larger gain, sorghum hay at $12.00 a ton was not as economical as cotton seed hulls at $7.00 a ton.